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ABSTRACT

The interaction of adult learning styles and the media, methods of instruction, and group functioning in a distance learning class using audiographics and computer-mediated communication was studied and compared with similar interaction in non-equivalent traditional classes. One graduate class in theory and practice of distance education, taught at a distance with 15 students, and 3 traditional on-campus classes were selected. The interaction of learning style and media, methods of instruction, group functioning, and support was determined by administering a questionnaire developed for the study and subjecting results to an analysis of variance. The major finding is that learning styles do not impact how students interact with media and methods of instruction, but do affect satisfaction with other learners. Class type impacts student satisfaction with media, methods, group satisfaction, goal setting, and group climate. Results of this study cannot be generalized because of the small sample in the distance class. (SLD)

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Impact of Learning Styles on Instructional Design for Distance Education

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Introduction

The increasing use of telecommunications to mediate the communication process in distance education will have a major impact on the design of distance education programs for the 21st century. An often forgotten element in the use of sophisticated technologies is the distance learner. Sound instructional design must take into account the variety of learners and their preferred learning styles and the way these learners interact with media, and methods of instruction in distance education. Campbell Coggins (1988) and Ehrman (1990) point out the dearth of research related to learning styles and learning style diagnosis in the distance education setting, although there have been studies in this area in the traditional academic setting.

The main purpose of this paper is to discuss the results of a study that examined the interaction of adult learning styles and the media, methods of instruction, and group functioning in a distance learning class which utilized audiographics and computer-mediated communication. The study also examines the interaction of adult learning styles and the media, methods of instruction, and group functioning in non equivalent traditional classes in order to determine whether there are salient characteristics in the interaction patterns that are common to both distance and traditional adult learning settings. Therefore, the objectives of this study are to:

1. Identify the learning styles that interacted positively with the types of media and methods used in the distance learning class in this study.

2. Identify the learning styles that interact positively with media, methods and group functioning in a traditional setting and determine whether there are common interaction patterns in both distance and traditional settings.
3. Determine the learning styles that are more conducive to group functioning at a distance.
4. Identify the type of distance learner that would require specific support systems.
5. Discuss the implications of the findings for the design of distance education courses.

Methodology

Four graduate classes at the University of New Mexico were selected for this study. One of these classes was on the Theory and Practice of Distance Education and was taught at a distance and is hereafter referred to as the "distance class." The predominant delivery medium was an audiographics system utilizing two phone lines, for audio and data. Data and graphics were transmitted via a high speed modem, a computer, graphics tablet, scanner, and a printer driven by IIS Technologies software. Electronic mail was also used for group discussions and learner support. The other three classes were traditional on-campus classes taught by a different instructor on Adult Learning, Training for Team Development, and Training and Consulting and are hereafter referred to as "traditional classes."

In order to determine the learning styles in both distance and traditional settings the Kolb Learning Style Inventory (1985) was administered to the classes in Fall 1991. This inventory is based on a Cartesian coordinate consisting of active experimentation versus reflective observation on the x-axis and concrete experience versus abstract conceptualization on the y-axis, yielding four dominant learning styles: Converger, Diverger, Assimilator, and Accommodator. Convergers are best at finding practical uses for ideas and theories; Divergers, at viewing concrete situations from many different points of view; Assimilators, at understanding a wide range of information and putting it into

concise, logical form, and Accommodators have the ability to learn primarily from "hands on" experience. The interaction of learning styles and media, methods of instruction, group functioning, and support was determined by administering a questionnaire developed by the researchers. The Inventory and questionnaire were administered to 74 students with a return rate of 96%. The distance learning class was comprised of 15 students, ten on-campus and 5 off-campus. The rest were traditional students. One factor and two factor ANOVAS were used for analyzing the interaction of learning styles and media, methods of instruction, and group functioning.

Results and Discussion

Media

Analysis of interactions of learning styles of both on-campus and off-campus students in the distance class with media (audiographics and e-mail) using a one factor ANOVA indicated no significant difference. However, it is interesting to note that when the interaction of class type, (whether students were on-campus or off-campus) was analyzed in relation to media, there was a significant difference ($F=15.04$, $p=.001$, $DF=1,13$). The on-campus students had a more positive experience with media (mean=25.3), than the off-campus students (mean=20.2). Therefore, the results of this study indicate that whether students are on-campus or off-campus is a better indicator than differences in learning styles of how students will interact with media. The difference could be due to the fact that students on-campus were more sophisticated users of e-mail and audiographics, had better access to computers and better access to support for the use of e-mail.

In order to determine whether learning styles interacted with the media used in traditional classes compared to the distance class, a two factor ANOVA was used. Results indicate no significant difference in the interaction of learning styles, class type (distance or

traditional) and media. Therefore, learning styles do not seem to be a good indicator of how students interact with media in either a traditional or distance setting.

Method of Instruction

The methods of instruction used in distance learning classes involved class discussions, group activities, and group presentations. Analysis of interactions between learning styles and methods of instruction in the distance class using an ANOVA revealed no significant differences. When the interaction between class type, (whether on-campus or off-campus) and the methods of instruction was examined, the results showed a significant difference. ($F=8.38$, $p=.01$, $DF=1,13$). These results support the findings of the analysis of learning styles and media, that class type, whether students are on-campus or off-campus rather than learning styles is a better indicator of differences in student attitudes toward media and methods used in the distance class. A two factor ANOVA that compared the interaction of learning styles in the distance and traditional classes with methods of instruction showed no significant differences. Learning styles do not seem to interact with methods in either traditional or distance classes.

Group Functioning

The examination of group functioning was an important aspect of this study as the groups in the distance class involved groups working at a distance where each group consisted of members both on-site and off-site. In order to determine the interaction of learning styles and group functioning, several variables related to group functioning were examined. These included satisfaction with the group, group communication, climate, decision making, conflict, group process, goal setting and leadership. There were no significant differences in the interaction of learning styles and these group variables. However, interaction of class type and the group variables indicated a significant difference for goal setting ($F=10.6$, $p=.006$, $DF=1,13$). The on-campus students were more satisfied with group goal setting (mean=15.1) than the off-campus students (mean=10.8).

Group functioning in the distance class was compared to group functioning in non-equivalent traditional classes which had similar group projects to determine whether specific learning styles were more conducive to group work. A two factor ANOVA examining the interaction of learning styles, class type (traditional vs. distance) and the group variables indicated a significant difference in goal setting and group climate ($F=3.0$, $p=.03$, $DF=3.1$, and $F=3.4$, $p=.02$, $DF=3,1$) respectively. Overall, the Accommodators and the Divergers in both traditional and distance settings were the most satisfied with group climate and goal setting.

Satisfaction with other learners was determined by questions which solicited student opinions on class discussions, group activities and group presentations by others. The interaction of learning style and learner satisfaction indicated a significant difference ($F=3.4$, $p=.05$, $DF=3,11$). The Accommodators, both on and off-campus in the distance class, were the most satisfied with class discussions and group activities (mean=13.0). The Convergers and the Assimilators showed moderate satisfaction (mean 11.0, and 11.8 respectively). The Divergers were the least satisfied with group activities (mean 4.5). An analysis of the interaction of class type, whether on or off-campus, and group satisfaction indicated a significant difference ($F=5.8$, $p=.03$, $DF=1,13$). The on-campus students were more satisfied with other learners and group activities (mean=24.4) than the off-campus students (mean=20.0).

In the traditional class, the interaction of learning styles and satisfaction with other learners was similar to the findings for the distance class.

Support Systems

The interaction of learning styles and support systems which included questions on the helpfulness of the distance learning coordinator at the site, the adequacy of library services, and the need for hands-on orientation with the distance learning technologies showed no significant differences. An analysis of the interaction of class type and support

also showed no significant differences. These results indicate that both on-campus and off-campus students were satisfied with the support systems provided.

Overall Satisfaction

Interaction of learning styles of both on and off-campus students and their satisfaction with the overall learning experience showed no significant differences. The distance class was compared with three non-equivalent traditional classes taught by a different instructor on different topics to determine the interaction of learning styles and student satisfaction with the overall learning experience. Although the media was different, the methods were similar in the traditional and distance classes. A two factor ANOVA was used to determine the interaction of learning styles, class type (traditional and distance) with overall satisfaction with the learning experience. Results show a significant difference in the interaction of learning styles and student satisfaction of the type of class they were enrolled in ($F=2.7$, $p=.05$, $DF=3,1$). The Accommodators, Convergers and the Assimilators in the distance class were much more satisfied with their overall learning experience than those in the traditional class as indicated by the means (Distance vs. Traditional - Accommodators: 30.0 vs.16.75, Convergers: 25.1 vs. 17.29, Assimilators: 27.8 vs.17.6). There was no difference for the Divergers (19.0 vs. 19.0).

Conclusions

The major finding of this study was that learning styles do not impact how students interact with media and methods of instruction. But, learning styles do affect satisfaction with other learners, with Accommodators the most satisfied and the Divergers the least satisfied with class discussions and group activities. Class type, whether students were on-campus or off-campus, rather than learning styles, impacts student satisfaction with media, methods, group satisfaction, goal setting, and group climate. The results of this study cannot be generalized because of the small sample in the distance class. Further research involving larger samples is necessary to validate these results.

Implications for Instructional Design

- Provide orientation programs for distance learners to make them comfortable with the media and methods in distance classes.
- Use class time for discussions and record lectures on tape for student check out.
- Interactive activities between sites must be planned carefully taking into consideration the different learning styles involved and understanding that certain learners may not want to be involved in group activities. Provide alternative activities for such learners.
- Provide guidance for group functioning with special attention to aiding students in goal setting and building a conducive group climate.
- Support systems that include both human and non-human resources must be available for the off-campus learner.
- Conduct further research using the Kolb, and other learning style instruments to diagnose learners and how they interact with media, methods and group functioning in distance classes.

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